

What is claimed is:

1. A computer implemented method for debugging a computer process,
comprising:
receiving a message from a processor implementing a computer process, said
5 message referencing context information pertaining to a particular action in said computer
process;
accessing breakpoint information specifying one or more breakpoints;
determining based upon said context information and said breakpoint information
whether a breakpoint has been reached; and
10 in response to a determination that a breakpoint has been reached, precluding said
processor from continuing with said computer process.
2. The method of claim 1, wherein precluding said processor from continuing
with said computer process is achieved without altering said computer process.
- 15 3. The method of claim 1, wherein said message is sent by said processor
prior to execution of said particular action.
4. The method of claim 1, wherein said message is sent by said processor
20 after execution of said particular action.
5. The method of claim 1, wherein said message is sent by said processor
upon failure to perform said particular action.

6. The method of claim 1, further comprising:

receiving user input indicating that said computer process should resume; and
instructing said processor to continue with said computer process.

5

7. The method of claim 1, wherein said processor is a transformation
processor for processing a transformation document and a source document to derive a
result document, and wherein said computer process is a transformation process.

10

8. The method of claim 7, wherein precluding said processor from continuing
with said computer process is achieved without altering said transformation document.

15

9. The method of claim 7, wherein said context information comprises:
an indication of a portion of said transformation document that is giving rise to
said particular action, and context information pertaining to said portion.

20

10. The method of claim 9, wherein said breakpoint information comprises a
breakpoint specification directed to said transformation document, and wherein
determining whether a breakpoint has been reached comprises:
determining, based upon said breakpoint specification and said context
information pertaining to said portion, whether one or more criteria specified in said
breakpoint specification has been met.

11. The method of claim 10, wherein said breakpoint specification comprises a locational breakpoint that specifies a particular location in said transformation document.

5 12. The method of claim 10, wherein said breakpoint specification comprises a conditional breakpoint specification that specifies one or more conditions to be met.

13. The method of claim 10, wherein said breakpoint specification comprises an Xpath expression.

10 14. The method of claim 7, wherein said context information comprises:
an indication of a portion of said source document that is a subject of said particular action, and context information pertaining to said portion.

15 15. The method of claim 14, wherein said breakpoint information comprises a breakpoint specification directed to said source document, and wherein determining whether a breakpoint has been reached comprises:

determining, based upon said breakpoint specification and said context information pertaining to said portion, whether one or more criteria specified in said
20 breakpoint specification has been met.

16. The method of claim 15, wherein said breakpoint specification comprises a locational breakpoint that specifies a particular location in said source document.

17. The method of claim 15, wherein said breakpoint specification comprises a conditional breakpoint specification that specifies one or more conditions to be met.

5 18. The method of claim 15, wherein said conditional breakpoint specification comprises an Xpath expression.

19. The method of claim 7, further comprising:
receiving a processing message from said processor;
10 in response to said processing message, granting a user an opportunity to terminate or to continue with said computer process;
receiving an indication from the user that the user wishes to continue with said computer process in spite of said processing message; and
instructing said processor to continue with said computer process.

15 20. The method of claim 19, wherein said processing message comprises an XSL message.

21. A computer readable medium comprising instructions which, when
20 executed by one or more processors, cause the one or more processors to debug a computer process, said computer readable medium comprising:

instructions for causing one or more processors to receive a message from a processing mechanism implementing a computer process, said message referencing context information pertaining to a particular action in said computer process;

instructions for causing one or more processors to access breakpoint information specifying one or more breakpoints;

instructions for causing one or more processors to determine based upon said context information and said breakpoint information whether a breakpoint has been reached; and

instructions for causing one or more processors to preclude, in response to a determination that a breakpoint has been reached, said processing mechanism from continuing with said computer process.

22. The computer readable medium of claim 21, wherein precluding said processing mechanism from continuing with said computer process is achieved without altering said computer process.

23. The computer readable medium of claim 21, wherein said message is sent by said processing mechanism prior to execution of said particular action.

24. The computer readable medium of claim 21, wherein said message is sent by said processing mechanism after execution of said particular action.

25. The computer readable medium of claim 21, wherein said message is sent by said processing mechanism upon failure to perform said particular action.

26. The computer readable medium of claim 21, further comprising:
5 instructions for causing one or more processors to receive user input indicating that said computer process should resume; and
instructions for causing one or more processors to instruct said processing mechanism to continue with said computer process.

10 27. The computer readable medium of claim 21, wherein said processing mechanism is a transformation processor for processing a transformation document and a source document to derive a result document, and wherein said computer process is a transformation process.

15 28. The computer readable medium of claim 27, wherein precluding said processing mechanism from continuing with said computer process is achieved without altering said transformation document.

29. The computer readable medium of claim 27, wherein said context
20 information comprises:
an indication of a portion of said transformation document that is giving rise to said particular action, and context information pertaining to said portion.

30. The computer readable medium of claim 29, wherein said breakpoint information comprises a breakpoint specification directed to said transformation document, and wherein said instructions for causing one or more processors to determine whether a breakpoint has been reached comprises:

5 instructions for causing one or more processors to determine, based upon said breakpoint specification and said context information pertaining to said portion, whether one or more criteria specified in said breakpoint specification has been met.

31. The computer readable medium of claim 30, wherein said breakpoint
10 specification comprises a locational breakpoint that specifies a particular location in said transformation document.

32. The computer readable medium of claim 30, wherein said breakpoint
specification comprises a conditional breakpoint specification that specifies one or more
15 conditions to be met.

33. The computer readable medium of claim 30, wherein said breakpoint specification comprises an Xpath expression.

20 34. The computer readable medium of claim 27, wherein said context information comprises:

an indication of a portion of said source document that is a subject of said particular action, and context information pertaining to said portion.

35. The computer readable medium of claim 34, wherein said breakpoint information comprises a breakpoint specification directed to said source document, and wherein said instructions for causing one or more processors to determine whether a
5 breakpoint has been reached comprises:

instructions for causing one or more processors to determine, based upon said breakpoint specification and said context information pertaining to said portion, whether one or more criteria specified in said breakpoint specification has been met.

10 36. The computer readable medium of claim 35, wherein said breakpoint specification comprises a locational breakpoint that specifies a particular location in said source document.

15 37. The computer readable medium of claim 35, wherein said breakpoint specification comprises a conditional breakpoint specification that specifies one or more conditions to be met.

38. The computer readable medium of claim 35, wherein said conditional breakpoint specification comprises an Xpath expression.

20 39. The computer readable medium of claim 27, further comprising:
instructions for causing one or more processors to receive a processing message from said processing mechanism;

instructions for causing one or more processor to grant, in response to said processing message, a user an opportunity to terminate or to continue with said computer process;

instructions for causing one or more processors to receive an indication from the user that the user wishes to continue with said computer process in spite of said action failure; and

instructions for causing one or more processors to instruct said processing mechanism to continue with said computer process in spite of said action failure.

40. The computer readable medium of claim 39, wherein said processing message comprises an XSL message.

41. A computer system, comprising:
a user interface for receiving input from and providing output to a user, said user interface receiving a plurality of breakpoint specifications from the user;
a debugging mechanism operatively coupled to said user interface, said debugging mechanism enforcing breakpoints specified by said breakpoint specifications; and
a processor operatively coupled to said user interface and said debugging mechanism, said processor implementing a computer process comprising a plurality of actions;

wherein said processor sends a message to said debugging mechanism pertaining to a particular action in said computer process, said message referencing context information pertaining to said particular action; and

wherein said debugging mechanism, in response to said message, determines based upon said breakpoint specifications and said context information whether a breakpoint has been reached, and in response to a determination that a breakpoint has been reached, said debugging mechanism precluding said processor from continuing with said computer process.

42. The system of claim 41, wherein said processor sends said message prior to executing said particular action.

43. The system of claim 41, wherein said processor sends said message after executing said particular action.

44. The system of claim 41, wherein said processor, after sending said message, waits for an instruction from said debugging mechanism to continue before continuing with said computer process.

45. The system of claim 44, wherein said debugging mechanism precludes said processor from continuing with said computer process by not instructing said processor to continue with said computer process.

46. The system of claim 41, wherein said processor is a transformation processor for processing a transformation document with a source document to derive a result document, and wherein said computer process is a transformation process.

47. The system of claim 46, wherein said user interface, in response to a determination that a breakpoint has been reached, displays and indicates to the user what portion of said source document and what portion of said transformation document
5 caused the breakpoint to be reached.

48. The system of claim 46, wherein said debugging mechanism enforces breakpoints without altering said transformation document.

10 49. The system of claim 46, wherein said context information comprises an indication of a portion of said transformation document that is giving rise to said particular action, and context information pertaining to said portion.

15 50. The system of claim 49, wherein said breakpoint specifications comprise a particular breakpoint specification directed to said transformation document, and wherein said debugging mechanism determines whether a breakpoint has been reached by determining, based upon said particular breakpoint specification and said context information, whether one or more criteria specified in said particular breakpoint specification has been met.

20 51. The system of claim 50, wherein said particular breakpoint specification comprises a locational breakpoint that specifies a particular location in said transformation document.

52. The system of claim 50, wherein said particular breakpoint specification comprises a conditional breakpoint specification that specifies one or more conditions to be met.

5

53. The system of claim 50, wherein said particular breakpoint specification comprises an Xpath expression.

54. The system of claim 46, wherein said context information comprises an indication of a portion of said source document that is a subject of said particular action, and context information pertaining to said portion.

55. The system of claim 54, wherein said breakpoint specifications comprise a particular breakpoint specification directed to said source document, and wherein said debugging mechanism determines whether a breakpoint has been reached by determining, based upon said particular breakpoint specification and said context information, whether one or more criteria specified in said particular breakpoint specification has been met.

56. The system of claim 55, wherein said particular breakpoint specification comprises a locational breakpoint that specifies a particular location in said source document.

57. The system of claim 55, wherein said particular breakpoint specification comprises a conditional breakpoint specification that specifies one or more conditions to be met.

5 58. The system of claim 55, wherein said particular breakpoint specification comprises an Xpath expression.